CLAIMS

We claim:

1. An isolated antibody comprising an amino acid sequence substantially as set out in SEQ ID NO:*n*, wherein *n* is 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, or 48; and wherein the antibody is capable of specifically binding GDF-8 or BMP-11.

2. The antibody of claim 1, comprising the amino acid sequence of SEQ ID NO:*n*, wherein *n* is 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, or 48.

3. The antibody of claim 1, wherein said antibody is an scFv fragment expressed by *E. coli* having ATCC Deposit Designation No. PTA-4741, PTA-4740, or PTA-4739.

4. The antibody of claim 1, wherein the antibody is capable of specifically binding to a protein comprising the amino acid sequence set forth in SEQ ID NO:54.

5. The antibody of claim 4, wherein at least (a) the second amino acid from the N-terminus of SEQ ID NO:54 is methionine, (b) the third amino acid from the N-terminus is serine, or (c) the fifth amino acid from the N-terminus is isoleucine, independently of each other.

6. The antibody of claim 1, wherein the antibody is human.

7. The antibody of claim 1, wherein the antibody is IgG_1 or IgG_4.

8. The antibody of claim 1, wherein the amino acid sequence of the antibody is modified to reduce or alter effector function.

9. The antibody of claim 8, wherein the amino acid sequence is modified at residues corresponding to amino acid 117 or amino acid 120 of SEQ ID NO:53.

10. The antibody of claim 1, wherein the antibody is $IgG_{1\lambda}$ or $IgG_{1\kappa}$.

11. A pharmaceutical composition, comprising the antibody of claim 1.

12. A method of treatment, comprising administering an effective dose of the pharmaceutical composition of claim 11.

13. The method of claim 12, wherein the pharmaceutical composition is administered to a mammal in need of treatment or prevention of a disorder chosen from muscle disorder, neuromuscular disorder, and bone degenerative disorder.

14. The method of claim 12, wherein the pharmaceutical composition is administered to a mammal in need of treatment or prevention of a disorder chosen from muscular dystrophy, Duchenne's muscular dystrophy, muscle atrophy, organ atrophy, carpal tunnel syndrome congestive obstructive pulmonary disease, sarcopenia, cachexia, muscle wasting syndrome, and amyotrophic lateral sclerosis.

15. The method of claim 12, wherein the pharmaceutical composition is administered to a mammal in need of treatment or prevention of Duchenne's muscular dystrophy.

16. The method of claim 12, wherein the pharmaceutical composition is administered to a mammal in need of treatment or prevention of a disorder chosen from obesity and adipose tissue disorder.

17. The method of claim 12, wherein the pharmaceutical composition is administered to a mammal in need of treatment or prevention of a disorder chosen from syndrome X, impaired glucose tolerance, trauma-induced insulin resistance, and type 2 diabetes.

18. The method of claim 12, wherein the pharmaceutical composition is administered to a mammal in need of treatment or prevention of type 2 diabetes.

19. The method of claim 12, wherein the pharmaceutical composition is administered to a mammal in need of treatment or prevention of obesity.

20. The method of claim 12, wherein the pharmaceutical composition is administered to a mammal in need for repair of damaged muscle.

21. The method of claim 21, wherein the damaged muscle is myocardial muscle.

22. The method of claim 21, wherein the damaged muscle is diaphragm.

23. The method of claim 12, wherein the antibody is administered at an effective dose chosen from 1 μg/kg to150 mg/kg, 1 μg/kg to

100 mg/kg, 1 μg/kg to 50 mg/kg, 1 μg/kg to 20 mg/kg, 1 μg/kg to 10 mg/kg, 1 μg/kg to 1 mg/kg, 10 μg/kg to 1 mg/kg, 10 μg/kg to 100 μg/kg, 100 μg to 1 mg/kg, and 500 μg/kg to 1 mg/kg.

24. An isolated nucleic acid encoding the antibody of claim 1.

25. An expression vector, comprising the nucleic acid of claim 24.

26. A host cell, comprising the vector of claim 25.

27. The host cell of claim 26, wherein said host cell is *E. coli* having ATCC Deposit Designation No. PTA-4741, PTA-4740, or PTA-4739.

28. The nucleic acid of claim 24, wherein the nucleic acid comprises a nucleotide sequence of SEQ ID NO:*n*, wherein *n* is 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, or 29.

29. A method of making an antibody that specifically reacts with GDF-8, the method comprises:

(a) providing a starting repertoire of nucleic acids encoding a variable domain which either include a CDR3 to be replaced or lack a CDR3 encoding region;

(b) combining the repertoire with a donor nucleic acid encoding an amino acid sequence substantially as set out in SEQ ID NO:*n* , where *n* is an integer from 31 to 48, such that the donor nucleic acid is inserted into the CDR3 region in the repertoire so as to provide a product repertoire of nucleic acids encoding a variable domain;

(c) expressing the nucleic acids of the product repertoire;

(d) selecting a specific antigen-binding fragment specific for GDF-8; and

(e) recovering the specific antigen-binding fragment or nucleic acid encoding the binding fragment.

30. An antibody produced by the method of claim 29

31. A method for identifying inhibitors of GDF-8, comprising:

(a) preparing a first binding mixture comprising the antibody of claim 1 and GDF-8;

(b) measuring the amount of binding between the antibody and GDF-8 in the first mixture;

(c) preparing a second binding mixture comprising the antibody, GDF-8, a test compound; and

(d) measuring the amount of binding between the antibody and GDF-8 in the second mixture.

32. A method of increasing muscle strength or mass, the method comprising administering a therapeutically effective amount of the antibody of claim 1 to a mammal, thereby increasing muscle strength or mass.

33. An isolated antibody against GDF-8, wherein the antibody is capable of inhibiting binding of GDF-8 to ActRIIB.

34. The antibody of claim 33 comprising the amino acid sequence substantially as set out in SEQ ID NO:*n*, wherein *n* is 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, or 48.

35. The antibody of claim 33 comprising the amino acid sequence as set out in SEQ ID NO:*n*, wherein *n* is 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, or 48.

36. A method of increasing muscle strength, the method comprising administering a therapeutically effective amount of the antibody of claim 33 to a mammal, thereby increasing muscle strength.

37. The antibody of claim 33 wherein the antibody is capable of specifically binding BMP-11.

38. A method of making an antibody, comprising culturing *E. coli* having ATCC Deposit Designation No. PTA-4741, PTA-4740, or PTA-4739 and recovering the antibody.

39. The method of claim 38, further comprising fusing the nucleic acid encoding the svFv of Myo29, Myo28, or Myo22 with nucleic acids encoding the Fc portion of an immunoglobulin and expressing the fused nucleic acid in a cell.

40. The method of claim 39, comprising germlining.

41. An antibody made using the method of claim 40.

42. An antibody capable of specifically binding to an epitope characterized by the amino acid sequence set forth in SEQ ID NO:54.